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LISTING OF CLAIMS

15. (currently amended) An apparatus for atomizing a fluid comprising:
- (a) a central passageway for allowing a fluid to be atomized to pass therethrough;
 - (b) an atomization zone positioned downstream from and in fluid communication with, said central passageway;
 - (c) and a plurality of atomization fluid passageways, comprising steam, configured to fluidly communicate with the central passageway via atomization fluid passageway outlets, wherein the atomization fluid passageway outlets have an [forward acute] angle greater than 60° to the central passageway and are positioned concentrically about a perimeter of the central passageway; [and]
 - (d) a heating zone configured to promote heat exchange between the central passageway and the plurality of atomization fluid passageways to superheat said steam, wherein the heating zone is positioned upstream from the atomization zone; and
 - (e) a mixing zone comprising a first inlet for a fluid to be atomized and a second inlet positioned upstream of said central passageway from said atomizing fluid passageway outlets, which second inlet is a sparger which is comprised of a cylindrical conduit containing a plurality of sparger fluid passageways to allow the passage of sparger fluid into said mixing zone, and which mixing zone is in fluid communication with said central passageway.
18. (original) The apparatus according to claim 15 wherein the central passageway has a cross-section having two-dimensions, wherein at least one of the two dimensions converges in a downstream direction along at least a portion of the length of the central passageway.
19. (currently amended) The apparatus according to claim 15 wherein the atomization zone has a cross-section comprising two dimensions and wherein at least one of the dimensions

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[converges] diverges in a downstream direction along at least a portion of the length of the atomization zone.

20. (currently amended) An apparatus for atomizing a fluid comprising:

- (a) a central passageway for allowing a fluid to be atomized to pass therethrough;
- (b) an atomization zone positioned downstream from and in fluid communication with, said central passageway;
- (c) a plurality of atomization fluid passageways, comprising steam, configured to fluidly communicate with the central passageway via atomization fluid passageway outlets, wherein the atomization fluid passageway outlets have an [forward acute] angle greater than 60° to the central passageway and are positioned concentrically about a perimeter of the central passageway; [and]
- (d) a heating zone configured to promote heat exchange between the central passageway and the plurality of atomization fluid passageways to superheat said steam, wherein the heating zone is positioned upstream from the atomization zone; [and]
- (e) a stream splitter positioned within the central passageway upstream from the atomization fluid passageway outlets[,] and
- (f) a mixing zone comprising a first inlet for a fluid to be atomized and a second inlet positioned upstream of said central passageway from said atomizing fluid passageway outlets, which second inlet is a sparger which is comprised of a cylindrical conduit containing a plurality of sparger fluid passageways to allow the passage of sparger fluid into said mixing zone, and which mixing zone is fluid communication with said central passageway; [and]

wherein the central passageway has a cross-section comprising two-dimensions, wherein [as] at least one of the two dimensions converges in a downstream direction along at least a portion of the length of the central passageway, wherein the atomization zone has a cross-section comprising two dimensions and wherein at least one of the dimensions diverges in a downstream direction along at least a portion of the length of the atomization zone.

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21. (currently deleted) The apparatus according to claim 20 further comprising a second inlet for atomization fluid positioned upstream within the central passageway from the atomization fluid passageway outlet.
22. (currently deleted) The apparatus according to claim 21 wherein the second inlet comprises a sparger.
23. (currently deleted) The apparatus according to claim 21 wherein the central passageway has a cross-section having two-dimensions, wherein both dimensions converge in a downstream direction along at least a portion of the length of the central passageway.
25. (currently amended) The apparatus according to claim 2[1]0 wherein the converging dimension of the central passageway and the diverging dimension of the atomization zone [spray distributor fluid passageway] are co-planar.
37. (currently amended) The [fluidized catalytic cracking unit] apparatus according to claim 25 wherein the central passageway has a cross-section having two-dimensions, wherein both dimensions converge in a downstream direction along at least a portion of the length of the central passageway.
38. (currently amended) The [fluidized catalytic cracking unit] apparatus according to claim 25 comprising a plurality of the feed nozzles.
39. (currently deleted) The apparatus according to claim 8 wherein the central passageway has a cross-section having two-dimensions, wherein both dimensions converge in a downstream direction along at least a portion of the length of the central passageway.

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40. (original) The apparatus according to claim 15 wherein the central passageway has a cross-section having two-dimensions, wherein both dimensions converge in a downstream direction along at least a portion of the length of the central passageway.

41. (currently amended) A nozzle for atomizing a petroleum product comprising:

(a) a central passageway for allowing a fluid petroleum feed to be atomized to pass therethrough;

(b) an outlet comprising an atomization zone and a spray distributor positioned downstream from and in fluid communication with, said central passageway, which spray distributor is configured to promote a predetermined spray pattern;

(c) a plurality of atomization fluid passageways fluidly communicating with the central passageway via atomization fluid passageway outlets, wherein the atomization fluid passageway outlets have an [forward acute] angle greater than 60° to the central passageway and are positioned concentrically about a perimeter of the central passageway; [and]

(d) a heating zone configured to promote heat exchange from the petroleum feed; [and the] to an atomization fluid before the petroleum feed and the atomization fluid mix[.]; and

(e) a second inlet positioned upstream of said central passageway from said atomizing fluid passageway outlets, which second inlet is a sparger which is comprised of a cylindrical conduit containing a plurality of sparger fluid passageways.

42. (currently deleted) The nozzle according to claim 41 further comprising a second inlet for an atomization fluid positioned upstream from the atomization fluid passageway outlet.

43. (currently deleted) The nozzle according to claim 42 wherein the second inlet comprises a sparger.

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44. (original) The nozzle according to claim 41 wherein the central passageway further comprises a stream splitter positioned within the central passageway upstream from the position at which the atomization fluid passageway exits into the central passageway.

45. (currently deleted) The nozzle according to claim 41 wherein the atomization fluid passageway outlets have a forward acute angle greater than 60°.

46. (original) The nozzle according to claim 41 wherein the central passageway has a circular cross-section and wherein the atomization fluid passageway outlets are positioned concentrically about the central passageway.

47. (original) The nozzle according to claim 41 wherein the central passageway has a cross-section having two-dimensions, wherein at least one of the two dimensions converges in a downstream direction along at least a portion of the length of the central passageway.

48. (currently deleted) The nozzle according to claim 41 wherein the spray distributor fluid comprises a passageway having a cross-section comprising two dimensions and wherein at least one of the dimensions diverges in a downstream direction along at least a portion of the length of the spray distributor fluid passageway.

49. (currently deleted) The nozzle according to claim 47 wherein the spray distributor fluid comprises a passageway having a cross-section comprising two dimensions and wherein at least one of the dimensions diverges in a downstream direction along at least a portion of the length of the spray distributor fluid passageway.

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50. (original) The nozzle according to claim 49 wherein the converging dimension of the central passageway and the diverging dimension of the spray distributor fluid passageway are coplanar.

52. (previously amended) The apparatus according to claim 18 wherein said sparger comprises at least one fluid passageway configured to allow fluid passage into said central passageway, wherein said sparger fluid passageways are configured to promote radial flow, axial flow, or combinations thereof, said flow relative to the overall direction of fluid flow in said central passageway.

53. (currently deleted) The apparatus according to claim 22 wherein said sparger comprises at least one fluid passageway configured to allow fluid passage into said central passageway, wherein said sparger fluid passageways are configured to promote radial flow, axial flow, or combinations thereof, said flow relative to the overall direction of fluid flow in said central passageway.

55. (original) The apparatus according to claim 4[3]1 wherein said sparger comprises at least one fluid passageway configured to allow fluid passage into said central passageway, wherein said sparger fluid passageways are configured to promote radial flow, axial flow, or combinations thereof, said flow relative to the overall direction of fluid flow in said central passageway.

56. (original) The apparatus of claim 15 wherein the plurality of sparger fluid passageways are configured to promote radial flow, axial flow, or a combination thereof, said flow relative to the overall direction of fluid flow through said central passageway.

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57. (original) The apparatus of claim 20 wherein the plurality of sparger fluid passageways are configured to promote radial flow, axial flow, or a combination thereof, said flow relative to the overall direction of fluid flow through said central passageway.